BEC TECHNOLOGIES

Rural Wireless Association Webinar

Oct. 19, 2019

FCC Performance Measures for Funds Recipients

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v1.0

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Agenda

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Purpose:

Quick overview of rules and potential solutions for carriers to measure broadband performance

- Highlights / Details
- Choices
- Potential actions
- Additional benefits
- Summary

Housekeeping notes:

Webinar audience members are muted but can ask questions and answer poll questions.
This webinar is being recorded. Slides and replay will be made available.

Caveat:

BEC are not FCC compliance experts. This is not legal/regulatory advice tailored to your company's specific situation. Consult your FCC attorneys or regulatory advisors to ensure your company maintains compliance to all directives.

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CONGRATULATIONS!

You applied and won funding…
Your team are building out your network to meet deadlines…

But….

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Details: Background

July 6, 2018: FCC released order **DA 18-710,** announcing new rules for carriers to measure broadband speed and latency performance, with the main requirements summarized in the Order's **Appendix A**

- Required for CAF Phase II carriers and other ETCs support recipients
- Mandates speed, latency performance tests, intervals, thresholds and reporting
- Test starts 7/1/2019 to meet first certification date 7/1/2020

GOAL: Greater accountability for funding recipients

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Rules apply to whom?

- Connected America Fund Phase I (CAF) Recipients
- Price Cap Carriers
- Rate-of-Return Carriers
- Rural Broadband Experiments (RBA) Recipients
- Alaska Plan Carriers
- **Connected America Fund Phase II (CAF II) Auction Winners**

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How do threshold requirements apply?

- Funding winners will typically commit to threshold service levels as a condition of receiving funding
- FCC Compliance reporting designed to track these commitments
- Sample: NY State Phase 3

Tier*	Speed (download/upload)	Latency	Monthly Usage Allowance
Above Baseline	≥ 100/20 Mbps	Low	Unlimited
Baseline	≥ 25/4 Mbps	Low	Unlimited
Minimum	≥ 25/3 Mbps	High	*≥150 GB***

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Choice of Testing Framework

- **Baseline: Measuring Broadband America (MBA) testing**
  - ongoing nationwide performance (National Broadband Plan.
  - in collaboration with SamKnows, an analytics firm supporting similar projects globally
  - relies on a whitebox with test embedded that attaches to router

More Details: *https://www.fcc.gov/general/measuring-broadband-america*

- **Existing Network Tools/Systems (Off-the-shelf testing)**
  - existing network management and monitoring tools
  - implement tests like Ping on servers like Ookla Speedtest
- **In-house Developed**
- **Some applicable standards:**
  - TR-069 allows for a standards based approach for auto-configuration servers (ACS)
  - TR-143 allows for connectivity with performance reporting mechanisms

Which solution(s) adapt and scale most effectively in your network?

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BEC Recommended Testing Framework

Existing Network Tools/Systems (Off-the-shelf testing)

- **Wireline Product Solutions**
  - Solution will use TR-143
  - Sample Supported Devices : Ultimum® Series: 8920NE, 8920A and 8700AXL
- **Wireless WAN Product Solutions**
  - BECentral
  - Supported Devices : All licensed LTE, Shared (CBRS) and Unlicensed 5GHz solutions
  - Unsupported Device: 6200 Series and 430M

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Network Tests Detail and Frequency

The FCC requires service providers to start network testing starting on the third quarter of 2019. Test results are to be submitted by July 1, 2020 and include the third and fourth quarters of 2019. The FCC is very clear about when and for how long tests should run:

- Testing Window

  Tests should run for one week during each quarter between 6:00 PM and 12:00 AM local time
  One download and one upload test per hour (6 tests/day * 7 days = 42 tests per location)
- Latency Measurements

  Test should run every minute for each of the (above) listed testing windows. If the subscriber's network consumption exceeds 64 Kbps, then the provider can cancel the measurement until this value is below 64 Kbps.
- Speed Measurements:

  One speed measurement per hour, starting at the first hour of the testing window. Speed measurements should be run both directions, download and upload. Similar to latency, if the subscriber is consuming more than 64 Kbps download and 32 Kbps upload, then testing can be postponed by one minute, until tests are run or canceled for that testing hour.

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Network Test Results

The FCC guidelines require Internet Service Providers to run these tests with up to 50 randomly-selected subscribers per state (per speed tier in the case of speed tests) and up to 50 randomly-selected subscribers per state in the case of latency measurements.

To comply with the FCC guidelines, 80% of the download measurements should be equal to, or higher than, the required download speed. The same holds true for the upload measurements. In the case of the round trip latency measurements, 95% or more of all the latency tests are "*at or below* 100 ms *when measured between the customer premises and a remote server that is located at or reached by passing through an FCC-designated IXP"* (Internet Exchange Point).

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Penalties for Non-Compliance

- ETCs that have between 85% and 100% of households that meet the test standards lose 5% of their FCC support.
- ETCs that have between 70% and 85% of households that meet the test standards lose 10% of their FCC support.
- ETCs that have between 55% and 75% of households that meet the test standards lose 15% of their FCC support
- ETCs with less than 55% of compliant households lose 25% of their support.

NOTE: For CAF II auction winners these reductions in funding would only be applied to the remaining time periods after they fail the tests.

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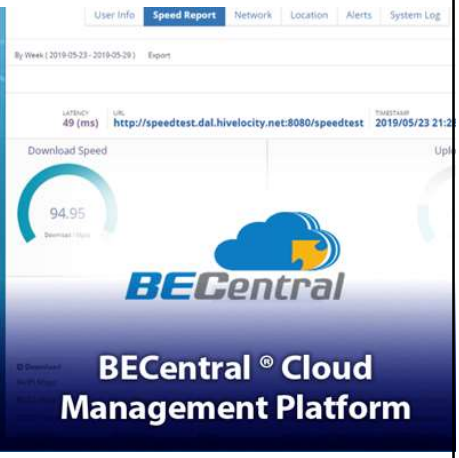
How can we help?

- BECs product solutions for wireline and wireless CPE
- Strive to be very cost effective



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Implementing Automated Testing

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BECentral® **Cloud Remote Management**

Cloud Based Remote Management Platform

Device Provisioning and Control
Simply field deployments, configure, update and manage all the devices on your network remotely

Analytics
Real-time analysis of collected measurement data, with visual charting of performance metrics and granular detail as well as quantitative overviews.

Automated Test Scheduling
Simple and intuitive 4 step process to setup test scheduling and reports across state and service tier combinations

Regulatory Compliance (INCLUDED!)
Enables compliance with FCC mandate for test frequency and test exceptions.

Application Program Interface
Well–defined API for integration with 3rd party tools & applications

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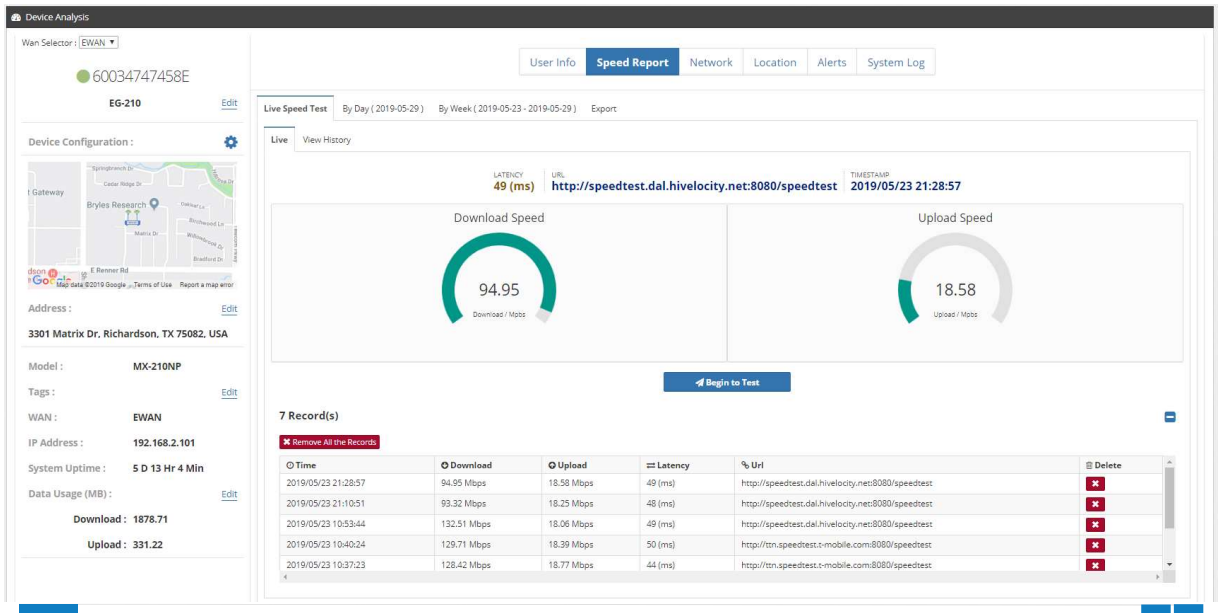
Live Speed Test



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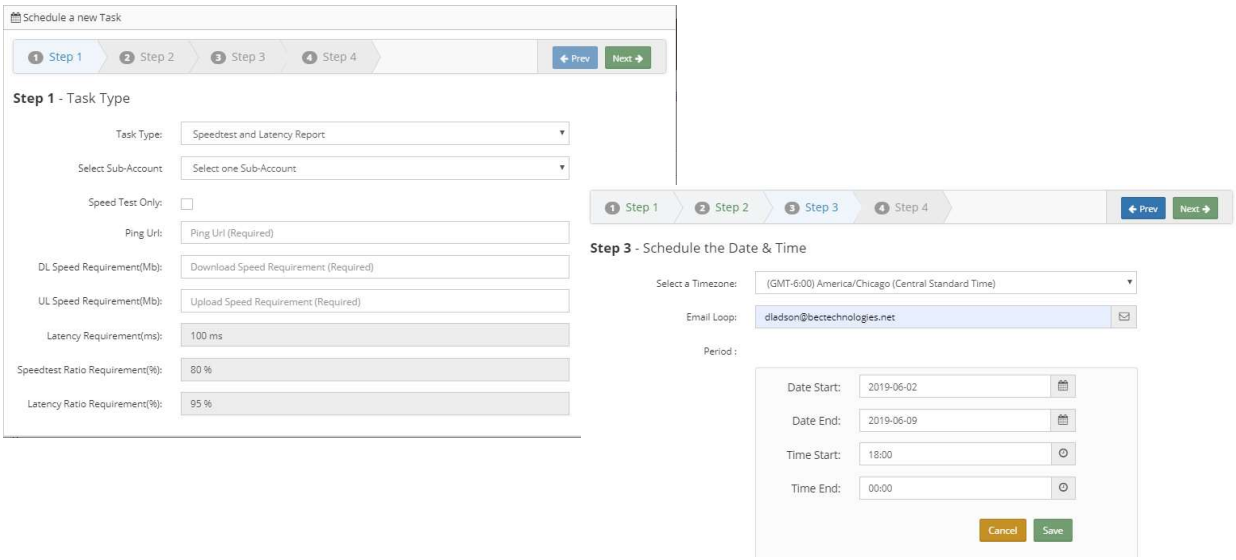
Test Scheduling



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Generated Report - Test Criteria

SCHEDULER TASK
EG-210 Performance and Latency

TEST METHOD
Speedtest and Latency

DEVICE UNDER TEST
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Test Model:

MX-210NP

Test Duration:

Friday 2019-05-29 through Friday 2019-05-31, 10:15:00 to 10:45:00

Test Criteria:

Speed Test Only	✖ No
Speedtest server URL	http://ttn.speedtest.t-mobile.com:8080/speedtest/upload.php
DUT Speedtest Download Pass Requirement ≥	25 Mb
DUT Speedtest Upload Pass Requirement ≥	5 Mb
DUT Latency Pass Requirement ≤	100 ms
DUT Speedtest Pass Ratio Requirement ≥	80 %
DUT Latency Pass Ratio Requirement ≥	95 %
Latency Server	8.8.8.8

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Generated Report - Test Results

Results:

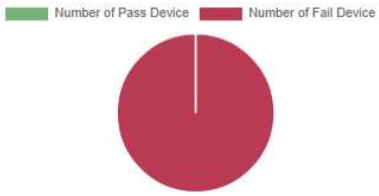
DL Speed Avg	72.00 Mbps
UL Speed Avg	18.73 Mbps
Latency Avg	29.82 ms

Fail Device(s) List:

60034747458E

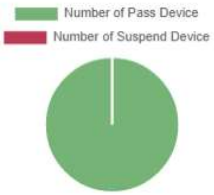
Pass Device Ratio:

Pass (0) / Fail (1)



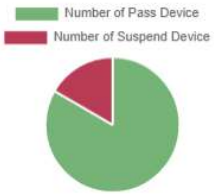
Suspend Speedtest Ratio:

Suspend (0) / Total (1)



Suspend Latency Ratio:

Suspend (5) / Total (30)



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Summary / Additional Points

- No time like now to get started
- Allow for soak time for the chosen solution to allow for mitigation
- Turn mandatory compliance into a meaningful differentiator
  - Can the platform be utilized for selling premium services?
  - SLA management
  - Other monetization

REMINDER: Please consult a qualified FCC regulatory expert for specific guidelines tailored to you network funding programs

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Some Additional Resources

- Measuring Broadband America / FCC
  - https://www.fcc.gov/general/measuring-broadband-america
- BEC Youtube channel / video on FCC Compliance solution
  - https://www.youtube.com/watch?v=hN67DER1KV4&feature=youtu.be
- New York Ph 3 Funding
  - https://nysbroadband.ny.gov/sites/default/files/rfp_guidelines_phase_3.pdf

NOTE: Please consult a qualified FCC regulatory expert for specific guidelines tailored to your specific network funding programs

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THANK YOU AND STAY IN TOUCH!

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